

WHAT IS CLAIMED IS:

1. A fusion protein comprising a first oligomerization domain that naturally associates into homodimeric structures and a second oligomerization domain that naturally associates into homotetrameric structures, wherein said first and second oligomerization domains are rigidly linked to each other.
2. The fusion protein according to Claim 1, wherein said first and second oligomerization domains are derived from naturally occurring proteins.
3. The fusion protein according to Claim 1, wherein said first and second oligomerization domains are rigidly linked to each other by a linking group.
4. The fusion protein according to Claim 1, wherein said first and second oligomerization domains have a geometry such that their symmetry axes are non-intersecting.
5. The fusion protein according to Claim 4, wherein said first and second oligomerization domains have a geometry such that their symmetry axes are parallel.
6. The fusion protein according to Claim 4, wherein said first and second oligomerization domains have a geometry such that their symmetry axes are non-intersecting and perpendicular.
7. The fusion protein according to Claim 4, wherein said first and second oligomerization domains have a geometry such that their symmetry axes are non-intersecting and form an angle of 45 degrees.
8. A fusion protein comprising a first oligomerization domain that naturally associates into homodimeric structures and a second oligomerization domain that naturally associates into

homotetrameric structures linked to each other by an alpha helical linking group.

9. The fusion protein according to Claim 8, wherein said first and second oligomerization domains have a geometry such that their symmetry axes are non-intersecting.

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10. The fusion protein according to Claim 8, wherein said first and second oligomerization domains have a geometry such that their symmetry axes are parallel.

11. The fusion protein according to Claim 8, wherein said first and second oligomerization domains have a geometry such that their symmetry axes are non-intersecting and perpendicular.

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12. The fusion protein according to Claim 8, wherein said first and second oligomerization domains have a geometry such that their symmetry axes are non-intersecting and form an angle of 45 degrees.

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13. A regular structure produced by the self-assembly of a plurality of fusion proteins according to Claim 1.

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14. The regular structure according to Claim 13, wherein said structure is homogenous with respect to its fusion protein components.

15. The regular structure according to Claim 13, wherein said regular structure is a two-dimensional layer.

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16. The regular structure according to Claim 13, wherein said regular structure is a three-dimensional crystalline network.

17. A method of producing a regular structure, said method comprising:
producing a plurality of fusion proteins according to Claim 1; and
combining said plurality of fusion proteins under conditions sufficient for said regular
structure to form.

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18. The method according to Claim 17, wherein said conditions are physiologic conditions or
other laboratory conditions under which the component oligomerization domains would be
stable.

10 19. The method according to Claim 17, wherein said producing and combining steps occur in
the same reaction medium.

20. The method according to Claim 17, wherein said producing and combining steps occur in
separate media.

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21. A nucleic acid encoding a fusion protein according to Claim 1.

22. An expression cassette comprising a transcriptional initiation region functional in an
expression host, a nucleic acid having a nucleotide sequence found in the nucleic acid according
20 to Claim 21 under the transcriptional regulation of said transcriptional initiation region, and a
transcriptional termination region functional in said expression host.

23. A cell comprising an expression cassette according to Claim 22 as part of an
extrachromosomal element or integrated into the genome of a host cell as a result of introduction
25 of said expression cassette into said host cell.

24. The cellular progeny of the host cell according to Claim 23.

25. A kit comprising a nucleic acid according to Claim 21.

26. A fusion protein of at least two oligomerization domains rigidly linked to each other,
wherein said fusion protein is capable of self-assembling with additional fusion proteins to
5 produce a regular structure.